Pre Calculus **Name:** KEY
Unit Circle Review (Review Packet #2) **Date:**

Unit Circle Review!!!!
YES, I KNOW IT'S YOUR FAVORITE!

1. a. Using the coordinates of points along the unit circle, what is the cosine function of an angle θ defined as? cosine is the x-value of the coordinate pair

   b. Using the coordinates of points along the unit circle, what is the sine function of an angle θ defined as? y-value

2. a. In what quadrants of the unit circle does the cosine function yield positive outputs?

   I & IV

   b. In what quadrants of the unit circle does the cosine function yield negative outputs?

   II & III

   c. In what quadrants of the unit circle does the sine function yield positive outputs?

   I & II

   d. In what quadrants of the unit circle does the sine function yield negative outputs?

   III & IV

3. $\sin\left(\frac{\pi}{3}\right) = \frac{\sqrt{3}}{2}$ $\cos\left(\frac{\pi}{2}\right) = 0$ $\cos\left(\frac{\pi}{6}\right) = \frac{\sqrt{3}}{2}$

4. $\sin(0) = 0$ $\sin\left(\frac{\pi}{4}\right) = \frac{\sqrt{2}}{2}$ $\cos\left(\frac{5\pi}{6}\right) = -\frac{\sqrt{3}}{2}$

5. $\sin\left(\frac{3\pi}{2}\right) = -1$ $\tan\left(\frac{\pi}{6}\right) = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$ $\cos\left(\frac{\pi}{3}\right) = \frac{1}{2}$

6. $\cos(0) = 1$ $\sin(\pi) = 0$ $\csc\left(\frac{2\pi}{3}\right) = \frac{2}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$

Inverse Trig Functions

7. $\arcsin\left(-\frac{1}{2}\right) = \frac{11\pi}{6}$

8. $\arctan(0) = 0$

9. $\sin^{-1}\left(\frac{\sqrt{2}}{2}\right) = \frac{\pi}{4}$

10. $\sin^{-1}(-1) = \frac{3\pi}{2}$ ~~$\frac{7\pi}{4}$~~

11. $\arctan(-1) = \frac{7\pi}{4}$

12. $\arctan\left(-\frac{1}{\sqrt{3}}\right) =$

13. $\arccos\left(\frac{1}{2}\right) = \frac{\pi}{3}$

14. $\sin^{-1}(0) = 0$

15. $\arcsin\left(-\frac{\sqrt{3}}{2}\right) = \frac{5\pi}{3}$

16. $\cos^{-1}(1) = 0$

17. $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right) = \frac{5\pi}{6}$

18. $\arccos\left(-\frac{1}{2}\right) = \frac{2\pi}{3}$

Sine and Cosine Graphs

19. Graph $f(x) = \sin\left(\frac{x}{2} + \frac{\pi}{2}\right) - 2$

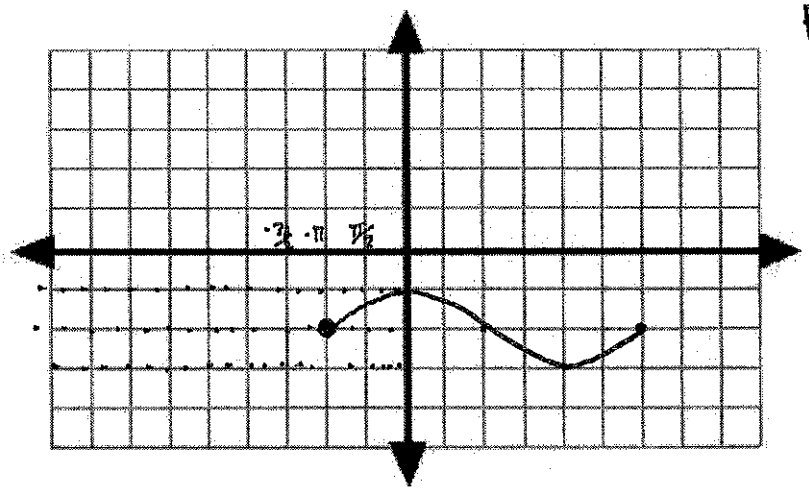
$f(x) = \sin\left(\frac{1}{2}(x+\pi)\right) - 2$

V.S. -2

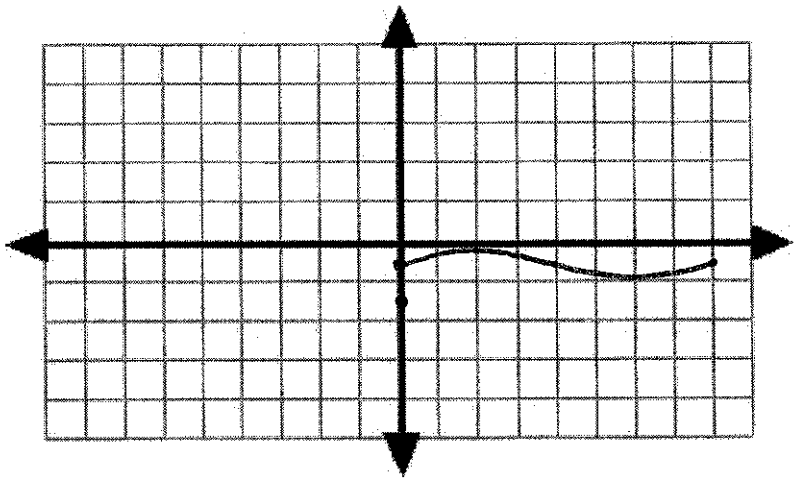
Amp: 1

Phase: $-\pi$

Period: $\frac{2\pi}{\frac{1}{2}} = 4\pi$



20. Graph $f(x) = 0.5\sin\left(\frac{1}{2}x\right) - 0.5$



V.S. $-.5$

Amp. $.5$

P.S. 0

Period: $\frac{2\pi}{\frac{1}{2}} = 4\pi$

21. Prove that $\frac{\sin x \cos x}{1 - \cos^2 x} = \cot x$

$\frac{\sin x \cdot \cos x}{\sin^2 x}$

$\frac{\cos x}{\sin x}$

$\cot x = \cot x$ ✓

22. Prove that $\cos x + \sin x \tan x = \sec x$

$\cos x + \sin x \cdot \frac{\sin x}{\cos x}$

$\frac{\cos x}{\cos x} \cdot \cos x + \frac{\sin^2 x}{\cos x}$

$\frac{\cos^2 x + \sin^2 x}{\cos x}$

$\frac{1}{\cos x}$

$\sec x = \sec x$ ✓

23. Prove that $\sin^2 x \cos^2 x = \frac{1 - \sin^2 x}{1 + \cot^2 x}$

$\frac{1 - \sin^2 x}{1 + \cot^2 x}$

$\frac{\cos^2 x}{\csc^2 x}$

$\frac{\cos^2 x}{\frac{1}{\sin^2 x}}$

$\frac{\sin^2 x \cdot \cos^2 x}{1}$

$\sin^2 x \cdot \cos^2 x = \sin^2 x \cdot \cos^2 x$ ✓